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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,606	09/28/2006	Teruyuki Sasaki	14434.111USWO	5238
52835	7590	05/12/2009	EXAMINER	
HAMRE, SCHUMANN, MUELLER & LARSON, P.C. P.O. BOX 2902 MINNEAPOLIS, MN 55402-0902			WALTERS JR, ROBERT S	
ART UNIT	PAPER NUMBER			
	1792			
MAIL DATE	DELIVERY MODE			
05/12/2009	PAPER			

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/594,606	SASAKI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	ROBERT S. WALTERS JR	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 06 February 2009.

2a) This action is **FINAL**.                    2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 6,8,10-12 and 15 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 6,8,10-12 and 15 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>10/16/2008</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application
	6) <input type="checkbox"/> Other: _____

**DETAILED ACTION**

***Status of Application***

Claims 1-5, 7, 9, 13 and 14 are cancelled. Claims 6, 8, 10-12 and 15 are pending and presented for examination.

***Response to Arguments***

Applicant's arguments filed 2/6/2009 have been fully considered but they are not persuasive. The applicant argues that Kamitani fails to teach the process of claim 6 of providing a silica-based film of greater than 300 nm thickness having high mechanical strength by utilizing greater than 3% silicon alkoxide and heating at a temperature greater than 150 °C. The examiner disagrees with this contention.

First, regarding the thickness of the film and content of silicon alkoxide, Kamitani teaches that films having a thickness of greater than 300 nm can be formed by utilizing more than 3 % of silicon alkoxide (column 4, lines 36-40), though the resulting properties of the film may not be optimal.

Second, regarding the temperature limitation, Kamitani only teaches a temperature of up to and including 150 °C, stating that above 150 °C the film neither increases compactness or improves adhesion (column 6, lines 13-21, it should be noted though that this is in only in reference to films less than 300 nm thick). However, the examiner contends it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a temperature of greater than 150 °C. One would have been motivated to make this modification as even though it

would not increase compactness or adhesion it would still be expected to lower the time necessary for the drying and curing step. Further, Kamitani teaches that a lower temperature can be utilized in their reaction because the coating liquid is a volatile alcohol and the film is spread, thereby allowing for quick vaporization of the solvent and rapid low-temperature reactivity (column 5, lines 39-56). However, if more silicon alkoxide is utilized to provide a thicker film of greater than 300 nm as noted above, it would have been obvious to one of ordinary skill in the art to utilize a higher temperature, as the solvent would not evaporate as readily and reactivity would be somewhat hindered in a thicker film.

Finally, with regards to applicant's added limitation that the silica-based film does not separate after the Taber abrasion test, it would be expected that a thicker film prepared by Kamitani's method by utilizing a larger amount of silicon alkoxide and a higher temperature would have the same properties as the film prepared by the claimed method (in the absence of evidence to the contrary) given that the compositions and process are virtually identical.

### ***Claim Objections***

Claims 8 and 10 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. These claims depend now depend from cancelled claims. For examination purposes, these claims have been interpreted to depend from claim 6.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 6, 8, 10-12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamitani et al. (U.S. Pat. No. 6465108).

I. Regarding claims 6, 8, 11, 12 and 15, Kamitani teaches a process for producing an article with a silica-based film by a sol-gel process, the article including a substrate and a silica-based film that is formed on the substrate (abstract). Kamitani teaches that the process comprises applying a film-forming solution for forming the silica-based film to the substrate (abstract), which may be a glass substrate (column 8, lines 13-20), and then the substrate can be heated (column 6, lines 13-21). Kamitani further teaches that the film-forming solution contains a silicon alkoxide, specifically a tetraalkoxysilane (column 2, lines 47-54), with a concentration of 0.01 to 3% by weight in terms of  $\text{SiO}_2$ , or greater than 3% by weight if a film exceeding 300 nm is desired (column 4, lines 36-40), alcohol (column 2, lines 29-33), water in 0 to 10% by weight (column 2, line 37), a strong acid as 0.001 to 1 normality (column 2, line 36), and that after applying the substrate can be heated at 150 °C. Kamitani fails to explicitly teach the film being substantially free from an organic substance, wherein the film-forming solution has the exactly claimed silicon alkoxide concentrations and the number of moles of water being at least four times and at most eight or ten times the total number of silicon atoms, or the film having a thickness of 350 nm to 1 micron, as well as heating the film at greater than 150 °C, such that the film does not separate after a Taber abrasion test.

First, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kamitani to have the number of moles of water being between four times and eight or ten times the total number of silicon atoms by routine optimization and one of ordinary skill in the art at the time of the invention would expect that this would necessarily lead to complete hydrolysis of the silicon alkoxide to provide a film that is substantially free from an organic substance.

Second, it would have been obvious to one of ordinary skill in the art to increase the concentration of silicon alkoxide to the claimed ranges through routine optimization to arrive at a film of between 350 nm to 1 micron, as Kamitani actually teaches that increasing the silicon alkoxide concentration increases the thickness of the film (column 4, lines 36-40). Furthermore, adjusting the thickness of the film will affect the quality of the film, as well as the utility of the film for various applications. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges for silicon alkoxide to arrive at the claimed range of thickness through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Third, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a temperature of greater than 150 °C (which would result in removal of any remaining organic substances, see column 6, line 47-column 7, line 4). One would have been motivated to make this modification as even though it would not increase compactness or adhesion it would still be expected to lower the time necessary for the drying and curing step. Finally, Kamitani teaches that a lower temperature can be utilized in their reaction because the coating liquid is a volatile alcohol and the film is spread, thereby allowing for quick vaporization of the solvent and rapid low-temperature reactivity (column 5, lines 39-56). However, if more silicon alkoxide is utilized to provide a thicker film of greater than 300 nm as noted above, it would have been obvious to one of ordinary skill in the art to utilize a higher temperature, as the

solvent would not evaporate as readily and the reactivity would be somewhat hindered in a thicker film.

Finally, with regards to applicant's added limitation that the silica-based film does not separate after the Taber abrasion test, it would be expected that a film prepared by Kamitani's method by utilizing a larger amount of silicon alkoxide and a higher temperature as described above would have the same properties as a film prepared by the claimed process (in the absence of evidence to the contrary) given that the compositions and process are virtually identical.

II. Regarding claim 10, Kamitani teaches all the limitations of claim 6 (see above) including a temperature of greater than 150 °C (see arguments above), but fails to teach utilizing a temperature of between 150 °C and 400 °C. However, as noted above, it would have been obvious to one of ordinary skill in the art at the time of the invention that changing the temperature will change the quality of the film as well as the time necessary for curing and drying of the film. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed temperature range through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

### ***Conclusion***

Claims 6, 8, 10-12 and 15 are pending.

Claims 6, 8, 10-12 and 15 are rejected.

No claim is allowed.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT S. WALTERS JR whose telephone number is (571)270-5351. The examiner can normally be reached on Monday-Friday, 8:00am to 5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571)272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael Barr/  
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1792

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May 11, 2009  
Examiner, Art Unit 1792